



Efficacy Data for

CITRUS FLOWER-QUAT One Step Disinfectant  
Germicidal Detergent and Deodorant  
(#0234)

Overview

CITRUS FLOWER-QUAT One Step Disinfectant Germicidal Detergent and Deodorant is a concentrated 4 ounce per gallon neutral hospital disinfectant that utilizes a highly efficacious quaternary blend of a Dialkyl quat with the first generation ADBAC quat, commonly referred to as the 5th Generation quat. This synergistic quat blend used in CITRUS FLOWER-QUAT One Step Disinfectant Germicidal Detergent and Deodorant exhibits high soil and hard water tolerance with mixed micelle soil removal performance that translates into a real world performance where conditions that breed microbial pathogens are seldom controlled.

Now with Swine Influenza A (H1N1) virus and Influenza A (H1N1) virus

Uses

Disinfectant, Non-Food Contact Sanitizer, Cleaner, Mildewstat, Fungicide, Virucide\*, Deodorizer (Odor Counteractant) (Odor Neutralizer) for Hospitals, Nursing Homes, Whirlpool, Households, Food Service, Commercial, Institutional, and Industrial Use (Only) (Suitable) For Use in Meat and Poultry Plants, Schools, Dairy, Equine, Poultry/Turkey Farm, Veterinary, Restaurant, Food Handling and Process Areas.

Effective in hard water up to 400 ppm hardness (Calculated as CaCO3) in the presence of 5% serum contamination. Non-Dulling to Floors (Floor Finishes).

Athletic Surface Disinfectant.

(Product of USA) (Made in the USA)

Meets OSHA Bloodborne Pathogen Standard for HIV, HBV and HCV.

Use	Dilutions	Quat Active	Hard Water
Hospital disinfectant	4 oz per gal of water	660 ppm	400 ppm
Virucidal	4 oz per gal of water	660 ppm	400 ppm
Fungicidal	4 oz per gal of water	660 ppm	400 ppm
Mold and Mildew	4 oz per gal of water	660 ppm	400 ppm
Sanitization (non-food contact )	4 oz per gal of water	660 ppm	400 ppm

Efficacy Hospital Disinfection (at 4 ounces per gallon)

CITRUS FLOWER-QUAT One Step Disinfectant Germicidal Detergent and Deodorant is bactericidal according to the AOAC Use Dilution Test method on hard inanimate surfaces modified in the presence of 5% organic serum and 400 ppm hard water at 4 ounces of this product per gallon of water (660 ppm active) Treated surfaces must remain wet for 10 minutes (Testing is performed per the AOAC UDT/GST method (DIS/TSS-1). Sixty carriers are required on 3 separate lots, one of which must be > 60 days old against Pseudomonas aeruginosa, Salmonella enterica and Staphylococcus aureus. Killing of 59 out of 60 carriers is required (total carriers = 540).)



Organism	Carrier Population	Sample	# Carriers	# Positive
Pseudomonas aeruginosa ATCC #15442	3.9 X 10 <sup>4</sup> CFU/Carrier	A (60 Days Old)	60	0 / 60
		B	60	0 / 60
		C	60	0 / 60
Salmonella enterica ATCC #10708	1.03 X 10 <sup>6</sup> CFU/Carrier	A (60 Days Old)	60	1 / 60
		B	60	1 / 60
		C	60	0 / 60
Staphylococcus aureus ATCC #6538	7.0 X 10 <sup>4</sup> CFU/Carrier	A (60 Days Old)	60	0 / 60
		B	60	0 / 60
		C	60	0 / 60

**Supplemental Organisms**

(Testing is performed per the AOAC UDT/GST method. Ten carriers are required on 2 separate lots against each supplemental organism. Killing of 10 out of 10 carriers is required (total carriers = 20).)

Organism	Carrier Population	Sample	# Carriers	# Positive
Acinetobacter baumannii ATCC 19003	5.1 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 10
		B	10	0 / 60
Acinetobacter lwoffii ATCC 15309	5.7 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Acinetobacter lwoffii ATCC 9957	4.0 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Bordetella bronchiseptica ATCC 10580	9.4 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Citrobacter freundii ATCC 8090	3.9 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Enterobacter aerogenes ATCC 13048	2.35 X 10 <sup>7</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Enterobacter agglomerans ATCC 27155	3.9 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Enterobacter cloacae ATCC 13047	3.3 X 10 <sup>7</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60



Organism	Carrier Population	Sample	# Carriers	# Positive
Enterococcus faecalis ATCC 19433	6.2 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Enterococcus faecalis Vancomycin Resistant (VRE) ATCC 51299	1.3 X 10 <sup>7</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Enterococcus hirae ATCC 10541	1.19 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Escherichia coli ATCC 11229	1.3 X 10 <sup>7</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Escherichia coli Spectrum B-Lactamase (ESBL) ATCC BAA-196	4.6 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Escherichia coli O111:H8 ATCC BAA-184	4.3 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Escherichia coli Tetracycline Resistant ATCC 47041	3.1 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Fusobacterium necrophorum ATCC 27852	5.8 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Klebsiella oxytoca ATCC 13182	1.07 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Klebsiella pneumoniae ATCC 13883	1.2 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Listeria monocytogenes ATCC 19117	7.7 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Micrococcus luteus ATCC 14452	1.1 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Micrococcus luteus ATCC 4698	4.8 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Pasturella multocida ATCC 12947	1.32 X 10 <sup>7</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Proteus vulgaris ATCC 13315	1.9 X 10 <sup>4</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Proteus vulgaris ATCC 9920	1.24 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Pseudomonas aeruginosa Tetracycline Resistant ATCC 27853	3.5 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60



Organism	Carrier Population	Sample	# Carriers	# Positive
Pseudomonas cepacia ATCC 25416	1.63 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Salmonella enterica ATCC 23564	9.2 X 10 <sup>4</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Salmonella enterica ATCC 4931	1.3 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Salmonella enterica serotype pullorum ATCC 19945	7.1 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Salmonella typhi ATCC 6539	8.3 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Salmonella typhimurium ATCC 23564	1.5 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
	5.6 X 10 <sup>5</sup> CFU/Carrier	B	10	0 / 60
Serratia marcescens ATCC 14756	6.2 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Serratia marcescens ATCC 9103	6.0 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Shigella flexneri ATCC 12022	2.6 X 10 <sup>4</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Shigella flexneri ATCC 9380	1.99 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Shigella sonnei ATCC 25931	1.04 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Staphylococcus aureus ATCC 14154	9.2 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Staphylococcus aureus ATCC 25923	6.6 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Staphylococcus aureus sub species aureus ATCC 33586	7.2 X 10 <sup>4</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Staphylococcus aureus Methicillin Resistant (MRSA) ATCC 33592	5.4 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Staphylococcus aureus Community Associated Methicillin Resistant (CA-MRSA)	6.3 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60



Organism	Carrier Population	Sample	# Carriers	# Positive
Staphylococcus aureus Community Associated Methicillin Resistant (CA-MRSA) (NARSA NRS384) Genotype USA300)	1.60 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Staphylococcus aureus Vancomycin Intermediate Resistant (VISA) ATCC5836	3.2 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Staphylococcus epidermidis ATCC 14990	1.56 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Staphylococcus epidermidis Antibiotic resistant ATCC51625	8.6 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Staphylococcus haemolyticus ATCC 29970	9.5 X 10 <sup>5</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Streptococcus agalactiae ATCC 13813	5.6 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Streptococcus mutans ATCC 25175	1.02 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
	1.3 X 10 <sup>4</sup> CFU/Carrier	B	10	0 / 60
Streptococcus pneumonia Penicillin Resistant ATCC 51915	9.6 X 10 <sup>4</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Streptococcus pyogenes ATCC 19615	4.7 X 10 <sup>4</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Vibrio cholera ATCC 11623	1.0 X 10 <sup>6</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60
Yersinia enterocolitica ATCC 23715	1.2 X 10 <sup>7</sup> CFU/Carrier	A	10	0 / 60
		B	10	0 / 60



**Virucidal against (at 4 ounces per gallon)**

This product was evaluated in the presence of 5% serum and 400 ppm hard water with a 10 minute contact time and found to be effective against the following viruses on hard nonporous environmental surfaces.  
 (Testing is performed per EPA Guidance (DIS/TSS-7). Two separate lots are tested. Inactivation of virus must be demonstrated at all dilutions when no cytotoxicity is observed or at all dilutions above the cytotoxic level when it is observed. The data must demonstrate a 3-log reduction in viral titer for both lots.) (3 lots and 4-Log reduction for Canada).

Organism	Dried Virus Control	Sample	Result	Log Reduction
Avian Influenza A (H3N2) virus (Avian Reassortant) (ATCC VR-2072)	4.75 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		C	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
Avian Influenza A (H5N1) virus	6.75 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥6.25 Log <sub>10</sub>
		B	≤0.5 Log <sub>10</sub>	≥6.25 Log <sub>10</sub>
Chlamydia psittaci ATCC VR-125	7.25 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥6.75 Log <sub>10</sub>
	4.75 Log <sub>10</sub>	B	≤0.5 Log <sub>10</sub>	≥6.75 Log <sub>10</sub>
		C	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
Cytomegalovirus ATCC VR-538	4.5 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥4.0 Log <sub>10</sub>
		B	≤0.5 Log <sub>10</sub>	≥4.0 Log <sub>10</sub>
		C	≤0.5 Log <sub>10</sub>	≥4.0 Log <sub>10</sub>
Hepatitis B Virus	5.06 Log <sub>10</sub>	A	≤0.27 Log <sub>10</sub>	≥4.79 Log <sub>10</sub>
	5.20 Log <sub>10</sub>	B	≤0.41 Log <sub>10</sub>	≥4.79 Log <sub>10</sub>
	5.06 Log <sub>10</sub>	Confirmatory B	≤0.27 Log <sub>10</sub>	≥4.79 Log <sub>10</sub>
Hepatitis C Virus	6.21 Log <sub>10</sub>	A	≤0.27 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
	6.21 Log <sub>10</sub>	B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
	6.06 Log <sub>10</sub>	Confirmatory B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
Herpes Simplex Virus Type 1 ATCC VR-773	5.5 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
	6.0 Log <sub>10</sub>	C	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
Herpes Simplex Virus Type 2 ATCC VR-734	6.0 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
	5.75 Log <sub>10</sub>	B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		C	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
Human Coronavirus ATCC VR-740	4.5 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
	4.5 Log <sub>10</sub>	B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		C	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
Human Immunodeficiency Virus type 1 (HIV 1) HTLV-III B	5.75 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
	5.75 Log <sub>10</sub>	B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		C	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>



Organism	Dried Virus Control	Sample	Result	Log Reduction
Influenza A virus ATCC VR-544	6.5 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
	6.0 Log <sub>10</sub>	C	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
Influenza A (H1N1) virus ATCC VR-1469	5.5 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
Respiratory syncytial virus	4.5 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
	5.0 Log <sub>10</sub>	C	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
SARS Associated Coronavirus	6.5 Log <sub>10</sub>	A	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		B	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>
		C	≤0.5 Log <sub>10</sub>	≥4.25 Log <sub>10</sub>

**Virucidal against (at 16 ounces per gallon)**

This product was evaluated in the presence of 5% serum and 400 ppm hard water with a 10 minute contact time and found to be effective against the following viruses on hard nonporous environmental surfaces.

(Testing is performed per EPA Guidance (DIS/TSS-7). Two separate lots are tested. Inactivation of virus must be demonstrated at all dilutions when no cytotoxicity is observed or at all dilutions above the cytotoxic level when it is observed. The data must demonstrate a 3-log reduction in viral titer for both lots.) (3 lots and 4-Log reduction for Canada).

Organism	Carrier Population	Sample	# Carriers	# Positive
Canine Parvovirus Type 2b, Nike Strain	7.5 Log <sub>10</sub>	A	≤3.5 Log <sub>10</sub>	≥4.0 Log <sub>10</sub>
		B	≤3.5 Log <sub>10</sub>	≥4.0 Log <sub>10</sub>
Rabies Virus	5.75 Log <sub>10</sub>	A	≤2.5 Log <sub>10</sub>	≥3.25 Log <sub>10</sub>
		B	≤2.5 Log <sub>10</sub>	≥3.25 Log <sub>10</sub>

**Fungicidal against (at 4 ounces per gallon)**

This product was evaluated in the presence of 5% serum and 400 ppm hard water with a 10 minute contact time and found to be effective against the following fungi on hard nonporous environmental surfaces.

(Testing is performed per the AOAC fungicidal method (DIS/TSS-6). Two separate lots are tested against Trichophyton mentagrophytes in a suspension test. Killing of all fungal spores in 10 minutes is required.)

Organism	Carrier Population	Sample	# Carriers	# Positive
Candida albicans ATCC #10231	1.57 X 10 <sup>5</sup> CFU/Carrier	A	10	0/10
		B	10	0/10
Trichophyton mentagrophytes ATCC #9533	1.10 X 10 <sup>5</sup> CFU/Carrier	A	10	0/10
		B	10	0/10



**Mold and Mildew Control (at 4 ounces per gallon)**

Use this product to control the growth of mold and mildew and their odors on hard, non-porous surfaces. Thoroughly wet all treated surfaces completely. Let air dry. Repeat application weekly or when growth or odor reappears.

Organism	Tile Number	Untreated After 7 Days	Sample A After 7 Days	Sample B After 7 Days
Aspergillus niger ATCC #16404	1	Growth 90%	No Growth 0%	No Growth 0%
	2	Growth 70%	No Growth 0%	No Growth 0%
	3	Growth 90%	No Growth 0%	No Growth 0%
	4	Growth 80%	No Growth 0%	No Growth 0%
	5	Growth 80%	No Growth 0%	No Growth 0%
	6	Growth 90%	No Growth 0%	No Growth 0%
	7	Growth 80%	No Growth 0%	No Growth 0%
	8	Growth 70%	No Growth 0%	No Growth 0%
	9	Growth 90%	No Growth 0%	No Growth 0%
	10	Growth 70%	No Growth 0%	No Growth 0%

**Non-Food Contact Surface Sanitizer**

Add 4 ounces of the product to 1 gallon of water to sanitize hard porous and non porous non-food contact surfaces. Treated surfaces must remain wet for 3 minutes. Then wipe with sponge, mop or cloth or allow to air dry. At this dilution food contact surfaces must be rinsed.

(Testing is performed per EPA Guidance (DIS/TSS-10). Three lots are required, one of which must be ≥60 days old. Testing is performed against Staphylococcus aureus and Klebsiella pneumoniae containing 5% organic load. Enterobacter aerogenes may be substituted for Klebsiella pneumoniae. The results must show a reduction of at least 99.9% (3 Log<sub>10</sub>) in the number of each test microorganism over the parallel control count within 5 minutes.

Organism	Dried Virus Control	Sample	3 Minute Kill cfu/Carrier	Percent Kill
Klebsiella pneumoniae ATCC 4352	6.04 Log <sub>10</sub>	A (60 days old)	>3.56 Log <sub>10</sub>	>99.9
		B	>3.56 Log <sub>10</sub>	>99.9
		C	>3.56 Log <sub>10</sub>	>99.9
Staphylococcus aureus ATCC #6538	6.69 Log <sub>10</sub>	A (60 days old)	>3.56 Log <sub>10</sub>	>99.9
		B	>3.56 Log <sub>10</sub>	>99.9
		C	>3.56 Log <sub>10</sub>	>99.9